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GEOGRAPHICAL NOTES.

BY

GEO. C. HURLBUT, *Librarian.*

A DEFENCE OF PINZON.*—In his introduction to this book Capt. Duro says that he has been moved to undertake a real defence of Pinzon (Martin Alonso) against charges too lightly formulated and repeated.

Pinzon, he says, "was a mirror of seamanship, one of the men who do the greatest honour to the Spanish marine, and the victim of injustice even more than of ignorance."

The arguments here presented have been advanced by the author on previous occasions, and especially in his communication entitled *Colón y Pinzón*, published in the tenth volume of the Memorias of the Real Academia de la Historia. Pinzon engaged, heart and soul, in the enterprise of the voyage to the west. He lent to it his influence and his energy, he risked his own person, he drew to it his brothers and his relatives, and he advanced the third part of the total outlay. Without Pinzon, it appears, Columbus could have done nothing. More than this ; nearly a hundred witnesses (and among them Bartholomew Columbus is named) opined at a later day that, but for Pinzon, the voyage, already far advanced, would have been abandoned and the discovery would not have been made.*

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* Pinzón en el Descubrimiento de las Indias, con Noticias criticas de algunas obras recientes relacionadas con el mismo descubrimiento, por Cesáreo Fernández Duro, de las reales Academias de la Historia y de Bellas Artes de San Fernando. Madrid, 1892.

On the 21st of November, 1492, the three vessels were sailing along the coast of Cuba, in the supposed direction of a region called by the natives Babeque (Haiti). Pinzon's vessel, the *Pinta,* outsailed the others and did not obey the signals made by Columbus for a change of route back to Cuba. In the morning the *Pinta* had disappeared. The other vessels kept together until Christmas Day, when the *Santa Maria* was wrecked on a sand bank near Port de Paix, on the northern coast of Haiti. Columbus then founded the colony of La Navidad, and set sail for Spain on the 4th of January, 1493, in the *Niña.* On the 6th he met the *Pinta.* Pinzon excused his absence, and Capt. Duro argues for him that he obeyed the orders given when the three vessels set out, that, being in advance of the others, he could not see the lights or signals, and that, while he was following a course known to Columbus, the latter had made a change which could not be known to Pinzon.

Columbus accepted, though he doubted, the excuses offered by Pinzon, and the two vessels joined company for the homeward voyage. A tremendous storm overtook them on the 12th of February, and raged for four days. The *Pinta,* with a sprung mast, ran before the gale to Bayona,† in Galicia; and this was, according to Capt. Duro, the proper course to follow. The *Niña* put in at the Azores on the 18th, and after a few days delay continued her voyage. She was overtaken by another tempest, and Columbus ran into the Tagus. On the 15th of March he reached Palos, and the *Pinta* arrived later in the day.

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* Por esto, los más de los dichos testigos, citando algunos á Bartolomé Colón en su número, juzgaban que sin Pinzón la armada se volviera y no descubrieran la tierra. *Pinzón,* p. 61.

† Mr. Fiske takes the *Pinta* to Bayonne, to the confusion of the reader. *The Discovery of America,* Vol. I., p. 442.

Capt. Duro criticises and condemns, as a seaman, the conduct of Columbus in making for the Tagus, with a gale blowing from the south and south-east, and contrasts it with the sound judgment displayed by Pinzon.

As to the letter written from Bayona to the sovereigns, in which Pinzon claimed for himself the merit of the discovery, Capt. Duro has something to say.

He thinks that, although no letter has been produced, Pinzon must have made a report of the voyage and its wonderful success. It was plainly his duty to do this, for he had parted company with the *Niña* in a storm by which she might have been overwhelmed, and the *Pinta* was, so far as he could know, the only survivor of the three vessels. There seems to be evidence that Pinzon did not claim the discovery for himself. Capt. Duro quotes from Asensio's *Cristóbal Colón*, tom. i., p. 263, the testimony of Juan de Aragón, of Moguer, that Martin Alonso Pinzon had said to him and to others that "Don Cristóbal Colón and Juan Niño and his brothers and relatives had discovered Indies, and had disembarked at Lisbon and were going to Barcelona." . . .

Another proof adduced is that while the *Pinta* was at Bayona it was visited by Pero Enriquez, a citizen of Palos, who was told "that the Admiral had discovered the islands" . . . (*Colón y Pinzón*, *Probanzas del Almirante*, p. 222).

Pinzon died only a few days after arriving at Palos. The story of his treachery to Columbus has been accepted as fact up to the present time, and Fernández Duro is the first to call it in question and, it must be said, to prove that it rests upon somewhat doubtful grounds.

He does not succeed in showing that Pinzon was free from blame in keeping up the separation from his commander for so long a time on the coast of Haiti, and his unfavorable comments on the supposed purpose of Columbus in seeking shelter at the Azores and at Lisbon are precisely in line with the unfair treatment to which Pinzon has been subjected. It must be added that Capt. Duro is even more anxious to attack Columbus than to defend Pinzon. He says very justly that his own nautical training gives him a right to speak with authority on matters of seamanship, but he forgets that Columbus knew something of navigation.

In his comments on the desertion of Pinzon, and the supposed conspiracy against the Admiral, Capt. Duro declares that, if Columbus believed Martin Alonso to be disloyal, his duty required him to take the severest measures ; and his readiness in accepting the excuse offered by Pinzon is contrasted with the conduct of Magellan* under similar circumstances. There is absolutely no resemblance between the situations. Magellan was confronted by an armed, successful revolt of the officers and crews of three ships, out of five that composed the squadron. He put down the mutiny and punished the leaders. Pinzon was not in revolt. He

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Mr. Winsor joins with Capt. Duro in this appreciation. *Christopher Columbus*, p. 574.

disclaimed the idea of desertion, and explained his absence so plausibly that Capt. Duro accepts the excuse; and yet Columbus is blamed for allowing Martin Alonso to clear himself, when nothing could be proved against him. The doubt remained, after the explanation; but what would have been said of Columbus if, acting on a doubt, he had proceeded to extremities with Pinzon?

Capt. Duro has brought a cloud of witnesses—one hundred, more or less—to prove that Columbus would have turned back in mid-ocean but for the energy of Pinzon. This testimony may be of service to the memory of Martin Alonso, but, so far as Columbus is concerned, it comes too late in the day. He did not turn back; he continued his voyage as commander of the three ships and accomplished his purpose, and it is of no use to tell us how he might have yielded if he had not been sustained by a stronger hand. He relied upon nothing but his own stout heart through the long years of unbroken disappointment and failure before he set out upon his voyage, and no testimony can make men believe that his courage gave way when the goal was fairly before his eyes.

Pinzon and Isabella and Spain deserve all the honor that belongs to them, but no more. They were not indispensable to Columbus. He had offered the Indies to other countries, and the offer had been declined. If Spain also had made the great refusal, he would have gone to France; and if he had failed in France, he would have gone to England.

Capt. Duro does himself no credit by insisting upon the quibble that Columbus found something which he did not go to seek.* He went to seek the Indies by the western route which led to them, and he found in his way the islands of a wholly unknown world, resembling the Indies in climate and productions. Capt. Duro may call this a chance discovery if he will, but that does not alter the facts ; and if any one suffers by the criticism it is not Columbus.

The learning of Fernández Duro has done much to lighten, though it could not dissipate, the cloud that darkens the name of Martin Alonso Pinzon.

THE ROYAL SOCIETY OF NEW SOUTH WALES.—The Royal Society of New South Wales offers its medal and £25 for the best communication (provided it be of sufficient merit) containing the results of original research or observation upon each of the following subjects : —

Series XII.—To be sent in not later than 1st May, 1893.

No. 40.—Upon the Weapons, Utensils and Manufactures of the Aborigines of Australia and Tasmania.

41.—On the Effect of the Australian Climate upon the Physical Development of the Australian-born Population.

42.—On the Injuries occasioned by Insect Pests upon Introduced Trees.

Series XIII.—To be sent in not later than 1st May, 1894.

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* *Pinzón*, p. 30 : *Observación curiosa*, *etc.*, a passage which reappears in Mr. Winsor's *Christopher Columbus*, p. 512 : "His discovery was a blunder," etc. Capt. Duro, farther on, speaks of "the chance discovery of the New World" : *la invención casual del Nuevo Mundo. Pinzón*, p. 101.

No. 43.—On the Timbers of New South Wales, with special reference to their fitness for use in construction, manufactures and other similar purposes.

44.—On the Raised Sea-beaches and Kitchen Middens on the Coast of New South Wales.

45.—On the Aboriginal Rock Carvings and Paintings in New South Wales.

The competition is in no way confined to members of the Society, nor to residents in Australia, but is open to all without any restriction whatever, excepting that a prize will not be awarded to a member of the Council for the time being; neither will an award be made for a mere compilation, however meritorious in its way. The communication, to be successful, must be wholly or in part the result of original observation or research on the part of the contributor.

The Society is fully sensible that the money value of the prize will not repay an investigator for the expenditure of his time and labor, but it is hoped that the honor will be regarded as a sufficient inducement and reward.

The successful papers will be published in the Society's annual volume. Fifty reprint copies will be furnished to the author free of expense.

Competitors are requested to write upon foolscap paper—on one side only. A motto must be used instead of the writer's name, and each paper must be accompanied by a sealed envelope bearing the motto outside, and containing the writer's name and address inside.

All communications to be addressed to the Honorary Secretaries.

F. B. KYNGDON, } *Hon. Secs.*
W. H. WARREN, }

THE SOCIETY'S HOUSE, 9 ELIZABETH ST.,
SYDNEY, 9th December, 1891.

CONGRESS OF ORIENTALISTS.—The Tenth Session of the International Congress of Orientalists will be held at Lisbon, from the 23d of September to the 1st of October, 1892.

At this Congress (according to the *Academy*, of August 27) the following papers will be read:

"Oriental Studies on the Lusiads," by Prof. Vasconcellos; "Letters from Monomotapa," by Senhor A. Coelho; "The Gypsies of Portugal," by Baron de Combarqua; "Ethiopian Discoveries," by Senhor E. Pereira; "The Religious Condition of the East at the Time of Alexander's Conquest," by M. Félix Robiou; "The Oriental MSS. at Lisbon," by Prof. René Basset, who will also report on those he has found in Northern Africa; "Indian Theogony and Sakti Worship," by Prof. Gustav Oppert, of Madras; "Indo-Egyptian Affinities," by Dr. Carl Abel; and "Sea-Voyages by Hindus," by Pandit Mahesh Chandra Nyaratna. There will be other papers. Excursions will be made (after the session of the Congress is terminated) to Seville, Granada and Malaga.

Another Congress, called the Ninth International Congress of Orientalists, was held in London during the week of the 5–12 of September and was very largely attended.

The unfortunate dissensions, which have separated the collective body of Orientalists into two rival camps, had their origin at the close of the session held at Stockholm and Christiania in 1889. It is to be hoped that a way may be found to restore good-feeling and harmony among these scholars, who meet internationally under the influence of sentiments which make nation hostile to nation.

THE HUNTERIAN SPELLING OF INDIAN WORDS.—Col. M. J. King-Harman, in the *Imperial and Asiatic Quarterly Review*, Second Series, Vol. III., No. 5, offers some military objections to Sir W. W. Hunter's system, now generally adopted, of spelling Indian names. These objections are fairly summed up in the following sentence, on p. 98:

"A careful consideration of the arguments on each side of the question may possibly lead to a recognition of the fact, that if a word is so written that it cannot be mispronounced by any ordinary reader, the chances are that it will also be correctly pronounced by everyone else; in which case it is to be hoped that the present rules may be revised."

This is truly an Orphic saying, highly creditable to its author, who has, however, forgotten to furnish a few specimens of words, so spelled that they cannot possibly be mispronounced.

Sir W. W. Hunter says on pp. xx.–xxi. of the Preface to the *Imperial Gazetteer of India*, 1881, that "it requires a careful study of the vernacular languages of India, and some knowledge of Sanskrit, which forms the key to them, before one is able to spell local names correctly in the native alphabets. It next requires a well-considered system of transliteration in order to render such names into the English character. For it must be remembered that the Sanskrit alphabet has fifty letters or signs, while the English alphabet has only twenty-six. . . . Indian names can therefore be represented only in a loose and popular manner in our alphabet; . . . A recognition of this fundamental difficulty should make an Indian spelling-reformer moderate in his aims and patient of opposition."

These considerations, with all their show of reason, do not seem to have occurred to Col. King-Harman, who goes on to express the pious hope that the intellectual standard of the few may be reduced to a level which will be easily attainable by the masses.

CLIMATIC CHANGES INDICATED BY THE GLACIERS OF NORTH AMERICA.—Under this title Mr. Israel C. Russell, of the U. S. Geological Survey, presents in the *American Geologist,* for May, some data concerning changes in North American glaciers. These glaciers are confined to the Cordilleran system and to the Greenland region. Their southern limit in the United States is about latitude 37°. They are confined to elevations not below 12,000 to 13,000 feet. Farther north, up to Washington, they are more numerous and are found at lower elevations; and they occur on Mt. Shasta and other peaks, at 10,000 or 11,000 feet. In the Rocky Mountains they begin at the south with bodies of snow in Colorado, and increase in number and extent towards the north. The best known Canadian glaciers are in the Selkirk Mountains and on the Stikine river.

The greatest development of glaciers is in Alaska. At the base of Mt. St. Elias, the snow line is 2500 feet above the sea, and the glaciers extend below this and reach the sea level near the mouth of the Stikine in latitude 57°. The great glacial belt of the Alaskan peninsula and the Aleutian islands is approximately 3000 miles long, and in the region about Mt. St. Elias not less than 30,000 square miles of exceedingly mountainous country are completely buried beneath a vast névé field, which is drained by alpine glaciers flowing north and south. The northern limit of glaciers on the west coast is less than a hundred miles north of St. Elias, and mountains in central and northern Alaska, 4000 or 5000 feet high, have no snow in the summer and are without glaciers. This region was not glaciated during the Glacial Epoch.

On the east side of North America glaciers are confined to Greenland and the neighboring islands. The ice-sheet of Greenland is of the continental type.*

The glaciers on the islands west of Greenland are of the alpine type. They have not been much explored.

Mr. Russell judges from personal observation that the small glaciers in the High Sierra of California are slowly receding. Those in Northern California, Oregon, Washington and British Columbia are either stationary or retreating.

In Alaska there is abundant evidence of a general retreat. At the Davidson glacier, on Lynn Canal, there is between the terminus of the ice and the encircling forest a barren tract half a mile broad, which has been left bare so lately that vegetation has not been able to take root. The retreat of the Muir Glacier since Vancouver's visit in 1794 is thought to be in the neighborhood of fourteen miles; and observations made in 1886 and 1890 show that in the interval between these dates it receded more than 1000 yards.

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* Mr. Russell arranges the glaciers in three classes, viz.: alpine, piedmont, and continental. Those which enter the ocean and break off in bergs are desig nated tide-water glaciers.

This observed rate of recession would, in 100 years, produce something like the shrinkage since Vancouver's time.

Mr. Russell's conclusions after two visits to the glaciers in the St. Elias region are that, without exception, they are rapidly retreating. Near Point Manby there is a locality where the Malaspina glacier has recently advanced about 1500 feet into a dense spruce forest, cutting off the trees and sweeping them into confused heaps. After advancing, the ice retreated, leaving a typical moraine surface filled with lakelets. This is the only instance of a recent advance that has come under Mr. Russell's notice.

Respecting the north side of the Mt. St. Elias Mountains, Dr. C. Willard Hayes, of the U. S. Geological Survey, who crossed from Selkirk House, on the Yukon river, to Copper river, in 1891, made observations on twelve glaciers and found that, with one exception, all were receding more or less rapidly. The exception was the Frederika glacier. This has its source in the eastern members of the Wrangell group of mountains, and flows south in a lateral valley, joining the Nizzenah at right angles. The front of the glacier is parallel with the river and about three-fourths of a mile from it, the intervening space being a gravel plain. The glacier terminates in a nearly vertical ice cliff about 250 feet high. It is slightly convex, and stretches entirely across the valley, about a mile in length.

Dr. Hayes suggests an explanation of the advance. Ten miles to the westward of the Frederika another much larger glacier flows into the valley of the Nizzenah. This glacier is formed by three streams, and the eastern of these seems to be retreating at a more rapid rate than the others. Dr. Hayes thinks it probable that this eastern branch has its source in the same basin as the Frederika, and that by some means the drainage has been diverted from the western to the eastern outlet, and that this diversion causes the rapid retreat in the former glacier and the advance in the latter.

The observations on the Greenland ice conflict with one another, but it seems probable that in that region alone, of all those in the Northern Hemisphere, the mass of the ice increases.

The advance and retreat of glaciers depend on climatic change. In general it is safe to assume that increased precipitation will favor their growth, and a rise of temperature lead to their retreat, but the data relating to the fluctuations of glaciers and to climatic changes are inadequate for satisfactory comparison.

THE FORESTS OF NEW YORK.--The annual report of the State Forest Commission shows that there were used for lumber in 1891 :

	Feet.
Spruce	179,135,432
Hemlock	77,789,833
Pine	21,183,354
Hardwood	8,601,974
Total	286,710,593

For wood pulp 62,000,000 feet of young spruce were consumed.

About 80,000 acres are cleared every year under present conditions, and this area will undoubtedly be increased.

The forest region of Northern New York embraces, according to the report, exclusive of scattered and detached pieces of outlying woodlands, 3,588,803 acres. This area is composed of:

	Acres.
Primeval forest	1,932,130
Lumber lands	1,348,587
Denuded	77,027
Burned	27,274
Water	67,686
Waste	31,121
Wild meadows	855
Improved	104,123
Total	3,588,803

On this showing the Commissioners make the following comment:

"So, with 80,000 acres cut over annually, it becomes evident that the merchantable timber on the 1,932,130 acres of primitive forest will be exhausted in less than twenty-five years.

"In view of these facts we protest that we should not be treated as alarmists. The indisputable figures of yearly consumption and forest area admit of but one conclusion. Unless the State obtains control of this territory, the next generation will find little or nothing left on the Adirondack Plateau which will be of interest or value to them."

THE PENINSULA AND VOLCANO OF COSEGÜINA.—The volume of the *Proceedings* of the American Association for the Advancement of Science, published in July, 1892, contains an abstract of a paper by Mr. J. Crawford, Government Geologist of Nicaragua, on the formidable volcano of Cosegüina.

The peninsula is a volcanic extension of the territory of Nicaragua north-westward into the Pacific Ocean. It lies between longitudes 87° 18′ and 87° 35′ west (Greenwich) and latitudes 12° 25′ and 13° 09′ north, with an average length of forty miles and a width of about twenty-eight miles. The Pacific is on the west and south-west, and the Gulf of Fonseca on the north.

The Cerro Cosegüina originated during the Laramie, or possibly the Lias, as a submarine volcano. It has an altitude of from 2000 to 2850 feet, or, including its volcanic cone, 3280 feet, and extends along and near the western margin of the Gulf of Fonseca for a total length of about fifteen miles. From the sea it looks like an immense oblong pyramid, marking the south-west side of the entrance to the gulf. In 1835, 1828, 1808, and earlier, Cosegüina and Conchagua, which is on the northern side of the gulf, were visible for many leagues at sea, the clouds of dust suspended above the volcanoes glowing with the lurid light of the heated cones. Dark columns of matter were ejected for thousands of feet in the air, and volcanic dust was carried for hundreds of miles. Capt. Eden, R.N., sailed through floating pumice-stones from these volcanoes when eleven hundred miles distant.*

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* The ashes and sand thrown out by Cosegüina in the eruption of 1835 fell in Bogotá, in Mexico, and in Jamaica. A note in the *Journal* of the Royal Geographical Society, Vol. V., p. 392, says: "His Majesty's ship *Conway*, cruising at the time in the Pacific, in lat. 7° N., long. 105° W., met with the same clouds of dust, apparently of pumice, with many fragments of the stone also floating, through a space of nearly forty miles from north to south."

The sides of the Cerro have been deeply eroded and the ridges formed on its sides, excepting those near the central volcanic cone, are covered with a vigorous vegetation, which includes slow-growing exogenous trees like the oaks. Near the middle of the longitudinal axis of the Cerro rises the volcano of Cosegüina. The crater, now partly filled with water, is about 1000 feet wide, and 2400 feet deep to the surface of the lake. The depth of the lake is not known, for it is inaccessible because of the steepness of the crater wall, which is composed of partly compacted lapilli, sands and ashes. Here and there project masses of hard lava and porous sulphur.

On the northwest side a narrow fissure extends from the lake to the top of the crater. On the west side of the Cerro a ridge 800 feet high at the point of union extends for about fourteen miles to the southward, gradually declining to a height of 150 feet at the ocean. Above its junction with the Cerro are spurs projecting at intervals until within 200 feet of the summit. These spurs mark the former height of substances ejected from the volcano all over the peninsula. Adjoining the volcanic cone on the north-east is a narrow, deep fissure penetrating to within a few hundred feet of the vertical axis of the volcano. Its bed is about 300 feet above the Gulf of Fonseca, its width is from twelve to twenty feet and its walls are of loose lavas, basalts and scoriæ. Artificial light is needed to explore this passage, which ends 1700 feet below the top of the Cerro, in a cavern about sixty feet long. Many wide ravines, perpendicular to the longitudinal axis of the mountain, have been excavated from the crest to the base, and between them the surface is covered with vegetation. All the trees within three or four miles of the cone have grown to their present size, from 6 to 26 inches in diameter, since 1835.

A chain of hills from 750 to 1200 feet in height, elevated by submarine pressure from the south-west, extends for thirty-five miles south-eastwardly, within four miles of the ocean.

Several valleys, in which are hills or knolls from 100 to 850 feet high, beginning at the Cerro, widen rapidly as they approach the ocean; and across these valleys lie cañons, from twenty to fifty feet wide, and 150 to 200 feet deep where they terminate.

The sides of these cañons distinctly display the number of eruptions and the character of the ejected materials from the "last submarine to the last subaërial eruption in 1835."

There are fissures at the foot of the Cerro and in a few places in the valleys, and from these issue streams from twenty to sixty feet wide and from two to four feet deep, soon disappearing in the loose, sandy soil. The water of these streams has a temperature of from 45° to 75° centigrade (113° to 199° Fahr.), and contains large percentages of sulphur and alkaline salts.

The mountain and peninsula originated as submarine volcanoes which began earlier than the Eocene, and the submarine lavas, on which the mountain and peninsula rest, are easily distinguishable from any of the later subaërial flows. They descend rapidly into the ocean, but on the eastern side, across the Gulf of Fonseca, they alternate with sedimentary strata of Laramie age, and with earlier rocks. They are interbedded with fluviomarine deposits, marls, etc., and with limestones of the Eocene. They are also mixed with coal of Upper Cretaceous age. To the north-east metamorphic rocks are mingled with these lavas.

The rocks at the end of the fissure on the east side of the volcanic cone are andesites trachytes and acid lavas. Several hundred feet nearer the surface are boulders of granitic rocks and breccia conglomerates, and also dolerites. At the surface are dolerites, basalts, lavas, lapilli, etc. These are strewn thickly over the surface of the valleys to a distance of four or five leagues from the volcano.

A mass of granitic rock, measuring 6x7x9 feet, rests on the lava about 1000 feet below the crater.

The sides of the cañons in the valleys record fourteen deposits of different kinds and colors, giving evidence of at least that number of periods of volcanic activity.

The waves of the Pacific are rapidly removing the peninsula and depositing the sediments in the off-shore basin in the crescent-shaped western coast of Nicaragua. The deposit of decomposed volcanic rocks in this basin, from Salvador, from Honduras and from Nicaragua, is probably from 20,000 to 30,000 feet in depth. This deep sediment appears in some way to decrease the activity of the volcanoes.

The water in the crater of Cosegüina is probably the head of the numerous hot fountains which rush from fissures in the valleys near the foot of the mountain.

The volcano is on a line with the following cones, in order N. W. and S. E.: Viejo, Telica, Las Pilas, Asososca, Momotombo, Momotombito, Masaya, Mombacho, Zapatera, Ometepe and Madera. These volcanoes appear to have been united to each other by a deep-seated subterranean fissure connecting across Nicaragua, for more than two hundred miles, the volcanic group in Salvador with that in Costa Rica. The ejected materials from this line of volcanoes form nearly all the western part of the country, where seven-tenths of its population reside, and where the largest towns are built.

At present vapors often rise from the cones of Ometepe, Momotombo and Telica, and occasionally from Cosegüina.

THE INTERCONTINENTAL RAILWAY.—Mr. Richard Renshaw Neill, Chargé d' Affaires of the U. S. Legation at Lima, has kindly communicated an account, published in *El Comercio* of August 5, of the journey of exploration from Quito to Cuzco, made by Messrs. W. D. Kelly, W. L. Wilson and J. D. Forster, of the Intercontinental Railway.

The party, composed of 18 persons with about 50 mules, left Quito a year ago and arrived at Cuzco, July 20, 1892, having endured many privations and hardships and lost all but six of the mules. Peru was entered on the 28th of November, along the Chinchipe river. In the middle of December Jaen was reached. After crossing the Chamayo river on rafts, the party arrived at Choros, on the left bank of the Marañon, navigable in this place for small steamers. The altitude was 2,400 feet above the sea. It had been intended to follow the Marañon to the neighborhood of Cerro de Pasco, but at Cujillo the explorers found themselves obliged to seek a higher level, the river flowing at a great depth between ravines, without vegetation and with no indication of mineral or other resources to justify the tracing of a route. They endeavored to continue their exploration through places in which the maximum calculated gradient might be preserved, and selected the line by Chota and Cajamarca.

The fertile mining district between Tacabamba and Chota was found to be one of those which offered the greatest facilities. The greatest elevation on the line selected was at a point half-way between Hualgoyoc and Cajamarca in a knot of the Cordillera where the waters divide, some flowing to the east, the others to the west. Following the left bank of the Cajamarca to its confluence with the Huamachuco, the party began to ascend this stream, and met at Cajabamba three companions, who had left the main body at Loja, in Ecuador, and had turned back because they found the roads impracticable. Mr. Kelly and his friends had fortunately taken the old Inca road, which they kept almost throughout their journey. Twelve leagues from Huamachuco, another water-shed was reached, and the route then led by Santiago de Chuco, Pallasca, and Corongo to Recuay in the Callejón (Pass) de Huailas. This Pass is formed by the Cordillera Blanca on the east and the Cordillera Negra on the west. At Huallanca, east of Recuay, there are excellent coal mines and silver mines three times as rich as those of Cerro del Pasco. Between these two points it would be necessary to construct three tunnels. The elevation was 10,300 feet, and though it was early in March and summer time, the explorers were surrounded with snow for five days.

Another ramification of the Cordillera was crossed to Queropalca and the lake of Lauricocha, supposed to be the source of the Marañon, which really has its origin in some small lakes farther to the south. Mines of cinnabar are found between Queropalca and Lauricocha.

At Cerro de Pasco, which was reached on the 6th of April, instructions were received from Washington to continue the exploration as far as Cuzco.

From Junin the route led along the eastern shore of lake Chinchaicocha, 13,422 feet above the sea, to a point between Oroya and Tarma, where the party met the engineers of the Peruvian Corporation, engaged in surveying the country between the Oroya and the river Perené. Leaving Huancayo on the 11th of May and following the Oroya river to the bridge of Izcuchaca, the party crossed the Department of Huancavelica, and arrived on the 1st of June at Ayacucho.

Starting again on the 6th of June the travellers climbed to Ocros, 13,858 feet above the sea, and there lost two days in the midst of snow and mist; afterwards descending to Pariabamba (7,040 feet elevation) on the river Pampas. The distance between Ocros and Pariabamba is only 44 miles, yet the former is in the region of perpetual snow, while the sugar cane is cultivated in the tropical valleys of the latter place. The Pampas was crossed on rafts (*balsas*) and on the 28th of June the highest point of the Cordillera (14,628 feet) was reached between Huancany and Huancabamba. At the latter place a halt was made for three days, and the march was then continued by Jochacachas (11,478 feet) and the river Pachachaca (5,700 feet) to Abancay. From Abancay, which was left on the 11th of July, three days brought the party to the river Apurimac, which was crossed at a point 6,083 feet above the sea, on an iron suspension bridge, constructed at Curahuasi and built three leagues higher up the river than the old bridge.

The greatest elevation between Abancay and Curahuasi was 12,900 feet. At this latter place began the last toilsome ascent, to the great pampa of Cuzco, by Limatambo, between which place and Surite an altitude of 12,348 feet was found. Crossing the pampa of Anta, the party finally reached Cuzco (11,013 feet) on the 20th of July.

El Comercio adds to this account a table of altitudes taken, as it states, not by barometer but by an instrument, "the results of which are of the most complete exactitude." Such an instrument deserves to be better known. The discrepancies between the measurements given in the text and those of the following table seem to be due to errors of the press:

Places.	Feet.	Places.	Feet.
Las Limas	2900	Mollepata	9255
San Ignacio	4974	Pallasca	10200
Chirinos	6576	Cabana	10400
Jaen	8389	Corongo	9908
Choros	2750	La Pampa	5625
Rio Marañon	2957	Yuramarca	4700
Cujillo	6451	Huaylas	8739
Machunga	7052	Mato	6988
A la Ramada	7999	Coros	7147
Auguía	9579	Yungay	8124
Tacabamba	7731	Carhuáz	8412
Conchan	8605	Huaráz	9537
Bambamarca	9300	Recuay	10615
Cajamarca	9843	Huallanca	11302
Jesus	9270	Cerro de Pasco	14293
Cajabamba	9374	Lago Junín	13422
Huamachuco	11035	Oroya	12166

Places.	Feet.
Jauja	11145
Huancayo	10635
Izcuchaca	9576
Acobamba	11261
Julcamarca	11093
Ayacucho	89[illegible]5
Ocros	10340
Concepción	10075
Rio Pampas	7000
Cachi	10803
Huancaray	9669
Rio Pachachaca	5700
Abancay	7853
Apurimac Rio	6083
Çuzco	11003

A NEW PHYSICAL ATLAS.—Messrs. Jno. Bartholomew & Co., Edinburgh, send the prospectus of a Physical Atlas, based on Berghaus's *Physikalischer Atlas.* The work will be edited by Mr. J. G. Bartholomew and Dr. H. R. Mill. *Orography* will be treated by Prof. Jas. Geikie, *Oceanography* by Dr. John Murray, *Geology* by Sir Archibald Geikie, *Meteorology* by Dr. Alex. Buchan and *Botany* by Prof. Bayley Balfour. The subjects of *Magnetism*, *Zoology*, *Ethnography* and *Demography* have not yet been arranged.

Mr. J. G. Bartholomew says that, while the Atlas will be based upon that of Berghaus, "it will be a much larger and more extensive work, comprehending a great deal of entirely new and original matter. The plates will be larger in size, and the various sections will be considerably amplified by the addition of numerous new maps, sections, curves, and diagrams, devoted especially to the more adequate illustration of phenomena of special interest to English and American students."

Mr. Bartholomew would have done well to point out those phenomena of the natural world which are interesting to English and American students, and are not interesting to students of other nationalities.

A PLAGIARIST EXPOSED.—*Petermanns Mitteilungen*, Band 38, IV. and V., published an account of travels in southeastern Persia, under the title of "Beiträge zur Kunde über den südöstlichen Teil Persiens. Von A. J. Ceyp."

Dr. Supan gives notice in No. VII. of the *Mitteilungen* that Mr. Ceyp's paper has been found to be—with the exception of a few immaterial additions and omissions—a shameless copy, word for word, of Gasteiger Khan's Reiseskizzen, originally published in the *Bote für Tirol und Vorarlberg*, of Innsbruck, and separately reissued at that place, in 1881.

The plagiarism was first detected by Gen. Houtum-Schindler, in Teheran.

The reissued article appears in the list of geographical publications for 1881–1882, in the *Zeitschrift* of the Berlin Gesellschaft für Erdkunde, Vol. XVII., p. 533, as follows: "v. Gasteiger Khan (A), Von Teheran nach Beludschistan. Reise-Skizzen. Innsbruck (Wagner), 1882. 8. (M. 1,60)."

GEOGRAPHY AT THE MEETING OF THE BRITISH ASSOCIATION.—The Edinburgh Meeting of the British Association was opened on the 3d of August, with an address by the President, Sir A. Geikie.

The proceedings in the Section of Geography, as reported in the London *Times*, are here reproduced.

The President of this Section, Professor James Geikie, LL.D., D.C.L., F.R.SS. L. and E., F.G.S., chose for his subject the geographical development of coastlines.

After reviewing the successive theories advanced by Celsius, who, from an examination of the coast lands of Sweden, attributed the retreat of the sea to a gradual drying up of the latter; by Playfair, who thought it much more likely that the land had risen, and whose theory was supported by Von Buch and Lyell; by Trautschold and others, who maintained that the sea-level may have changed without reference to movements of the lithosphere; by Hilber, who suggested that sinking of the sea-level may be due, in part at least, to absorption; by Schmick, who believed that the apparent elevation and depression of continental areas was really the result of grand secular movements of the ocean; by Professor Suess, who, believing that in equatorial regions the sea is, upon the whole, gaining on the land, while in other latitudes the reverse would appear to be the case, points out that this is in harmony with his view of a periodical flux and reflux of the ocean between the equator and the poles; the President said that, apart from all hypothesis and theory, we learned that the surface of the sea is not exactly spheroidal. It reaches a higher level on the borders of the continents than in midocean, and it varies likewise in height at different places on the same coast. The attraction of the Himalaya, for example, suffices to cause a difference of 300 ft. between the level of the sea at the delta of the Indus and on the coast of Ceylon. Geographers, however, must for the present be content to take the world as they find it. What we do know is that our lands are distributed over the surface of a great continental plateau of irregular form, the bounding slopes of which plunge down more or less steeply into a vast oceanic depression. So far as geological research has gone, there is reason to believe that these elevated and depressed areas are of primeval antiquity—that they antedate the very oldest of the sedimentary formations. There is abundant evidence, however, to show that the relatively elevated or continental area has been again and again irregularly submerged under tolerably deep and wide seas. But all historical geology assures us that the continental plateau and the oceanic hollows have never changed places, although from time to time portions of the latter have been ridged up and added to the margins of the former, while ever and anon marginal portions of the plateau have sunk down to very considerable depths. We may thus speak of the great world-ridges as regions of dominant elevation, and of the profound oceanic troughs as areas of more or less persistent depression. From one point of view, it is true, no part of the earth's surface can be looked upon as a region of dominant elevation. Our globe is a cooling and contracting body, and depression must always be the prevailing movement of the lithosphere. The elevation of the continental plateau is thus only relative. Although it is true that the land surface is nowhere co-extensive with the great plateau, yet the existing coast-lines may be said to trend in the same general direction as its margins. So abruptly does the continental plateau rise from the oceanic trough that a depression of the sea-level, or an elevation of the plateau, for 10,000 ft., would add only a narrow belt to the Pacific Coast between Alaska and Cape Horn, while the gain of land on the Atlantic slope of America between 30° N.L. and 40° S.L. would not be much greater. In the higher latitudes of the Northern Hemisphere, however, very considerable geographical changes would be accomplished by a much less amount of elevation of the plateau. Were the continental plateau to be upheaved for

3,000 ft. the major portion of the Arctic Sea would become land. Thus, in general terms, we may say that the coast-lines of Arctic and temperate North America and Eurasia are further withdrawn from the edge of the continental plateau than those of lower latitudes. In the geographical development of our land, movements of elevation and depression have played an important part. But we cannot ignore the work done by other agents of change. If the orographical features of the land everywhere attest the potency of plutonic agents, they no less forcibly assure us that the inequalities of surface resulting from such movement are universally modified by denudation and sedimentation. Elevated plains and mountains are gradually demolished, and the hollows and depressions of the great continental plateau become slowly filled with their detritus. Thus inland seas tend to vanish, inlets and estuaries are silted up, and the land in places advances seaward. The energies of the sea, again, come in to aid those of rain and rivers, so that under the combined action of all the superficial agents of change the irregularities of coast-lines become reduced, and, were no crustal movement to intervene, would eventually disappear. To sum up, then, we may say that the chief agents concerned in the development of coast-lines are crustal movements, sedimentation, and marine erosion. All the main trends are the result of elevation and depression. Considerable geographical changes, however, have been brought about by the silting up of those shallow and sheltered seas which, in certain regions, overflow wide areas of the continental plateau. Throughout all the ages, indeed, epigene agents have striven to reduce the superficial inequalities of that plateau, by levelling heights and filling up depressions, and thus, as it were, flattening out the land surface and causing it to extend. The erosive action of the sea, from our present point of view, is of comparatively little importance. It merely adds a few finishing touches to the work performed by the other agents of change. After a short account of the geographical evolution of Europe; of North America, in which, he said, there seems little doubt that land connexion obtained between Greenland and Europe in Cainozoic times, along the broad ridge upon which the Færöe Islands and Iceland are founded, for relics of the same Tertiary flora are found in Scotland, the Færöe Islands, Iceland, and Greenland; of the Gulf of Mexico and the Caribbean Sea, which have frequently been compared to the Mediterranean, so that one may say the Mexican-Caribbean Sea and the Mediterranean are rather homologous than simply analogous; of the Atlantic coasts of Africa and South America which presented some points of resemblance and some of contrast with each other; and of the coast-lines of the Pacific Ocean, the Asiatic coasts of which offer a strong contrast to those of the American borders, and in which an elevation of land for 6,000 ft. or 7,000 ft. in the seas surrounding the great chain of islands from Kamchatka to the Philippines and New Guinea would enclose those seas by continuous land, so that all the principal islands of the East Indian Archipelago—Sumatra, Java, Celebes, and New Guinea, would become united to themselves as well as to Australia and New

Zealand; Professor Geikie summed up as follows:—In fine, then, we arrive at the general conclusion that the coast-lines of the globe are of very unequal age. Those of the Atlantic were determined as far back as Palæozoic times by great mountain uplifts along the margin of the continental plateau. Since the close of that period many crustal oscillations have taken place, but no grand mountain ranges have again been ridged up on the Atlantic seaboard. Meanwhile the Palæozoic mountain-chains, as we have seen, have suffered extensive denudation, have been planed down to the sea-level, and even submerged. Subsequently converted into land, wholly or partially as the case may have been, they now present the appearance of plains and plateaus of erosion, often deeply indented by the sea. No true mountains of elevation are met with anywhere in the coast-lands of the Atlantic, while volcanic action has well-nigh ceased. In short, the Atlantic margins have reached a stage of comparative stability. The trough itself, however, is traversed by at least two well-marked banks of upheaval—the great meridional Dolphin Ridge, and the approximately transmeridional Færöe-Icelandic belt—both of them bearing volcanic islands. But while the coast-lands of the Atlantic proper attained relative stability at an early period, those of the Mediterranean and Caribbean depressions have up to recent times been the scenes of great crustal disturbance. Gigantic mountain-chains were uplifted along their margins at so late a period as the Tertiary, and their shores still witness volcanic activity. It is upon the margins and within the troughs of the Pacific Ocean, however, that subterranean action is now most remarkably developed. The coast-lines of that great basin are everywhere formed of grand uplifts and volcanic ranges, which, broadly speaking, are comparable in age to those of the Mediterranean and Caribbean depressions. Along the north-east margin of the Indian Ocean the coast-lines resemble those of the Pacific, being of like recent age, and similarly marked by the presence of numerous volcanoes. The northern and western shores, however (as in Hindostan, Arabia, and East Africa), have been determined rather by regional elevation or by subsidence of the ocean floor than by axial uplifts—the chief crustal disturbances dating back to an earlier period than those of the East Indian Archipelago. It is in keeping with this greater age of the western and northern coast-lands of the Indian Ocean that volcanic action is now less strongly manifested in their vicinity. I have spoken of the comparative stability of the earth's crust within the Atlantic area as being evidenced by the greater age of its coastal ranges and the declining importance of its volcanic phenomena. This relative stability is further shown by the fact that the Atlantic seaboard is not much disturbed by earthquakes. This, of course, is what might have been expected, for earthquakes are most characteristic of volcanic regions and of those areas in which mountain uplifts of recent geological age occur. Hence the coast-lands of the Pacific and the East Indies, the borders of the Caribbean Sea, the volcanic ridges of the Atlantic basin, the lands of the Mediterranean, the Black Sea, and the Aralo-Caspian depressions, the shores of the Red Sea, and vast tracts of Southern

Asia, are the chief earthquake regions of the globe. It may be noted, further, that shocks are not only most frequent but most intense in the neighborhood of the sea. They appear to originate sometimes in the volcanic ridges and coastal ranges, sometimes under the floor of the sea itself. Now earthquakes, volcanoes, and uplifts are all expressions of the one great fundamental fact that the earth is a cooling and contracting body, and they indicate the lines of weakness along which the enormous pressures and strains induced by the subsidence of the crust upon its nucleus find relief. We cannot tell why the coast-lands of the Atlantic should have attained at so early a period a stage of relative stability—why no axial uplifts should have been developed along their margins since Palæozoic times. It may be that relief has been found in the wrinkling-up of the floor of the oceanic trough, and consequent formation of the Dolphin Ridge and other great submarine foldings of the crust. And it is possible that the growth of similar great ridges and wrinkles upon the bed of the Pacific may in like manner relieve the coast-lands of that vast ocean, and prevent the formation of younger uplifts along their borders. I have already remarked that two kinds of elevatory movements of the crust are recognized by geologists—namely, axial and regional uplifts. Some, however, are beginning to doubt, with Professor Suess, whether any vast regional uplifts are possible. Yet the view that would attribute all such apparent elevations of the land to subsidence of the crust under the great oceanic troughs is not without its difficulties. Former sea-margins of very recent geological age occur in all latitudes, and if we are to explain these by sub-oceanic depression, this will compel us to admit, as Suess has remarked, a general lowering of the sea-level of upwards of 1,000 feet. But it is difficult to believe that the sea-floor could have subsided to such an extent in recent times. Suess thinks it is much more probable that the high-level beaches of tropical regions are not contemporaneous with those of higher latitudes, and that the phenomena are best explained by his hypothesis of a secular movement of the ocean—the water being, as he contends, alternately heaped up at the equator and the poles. The strand-lines in high latitudes, however, are certainly connected with glaciation in some way not yet understood. And if it cannot be confidently affirmed that they indicate regional movements of the land, the evidence, nevertheless, seems to point in that direction. In concluding this imperfect outline-sketch of a large subject, I ought perhaps to apologize for having trespassed so much upon the domains of geology. But in doing so I have only followed the example of geologists themselves, whose divagations in territories adjoining their own are naturally not infrequent. From much that I have said it will be gathered that with regard to the causes of many coastal changes we are still groping in the dark. It seems not unlikely, however, that as light increases we may be compelled to modify the view that all oscillations of the sea-level are due to movements of the lithosphere alone. That is a very heretical suggestion ; but that a great deal can be said for it any one will admit after a candid perusal of Suess's monumental work, " Das Antlitz der Erde."

Mrs. Bishop (formerly Miss Isabella Bird) read a paper on her travels in Lesser Tibet. She left Kashmir in the early spring of 1889 for a four months' journey, her outfit consisting of two servants, a Pathan soldier, three baggage ponies, an Arab horse, a small Cabul tent, and a shelter hut 5 ft. square. She occupied 25 days for the 19 marches from Kashmir to the Ladakh capital. The three great steps to the Tibetan heights from Kashmir were the Zagi La, 11,300 ft. high ; the Nomika La, 13,000 ft., and the Fotu La, 13,500 ft. The Zagi La was not only the dividing line between Kashmir and its dark-skinned people and the Tibetan altitudes with their yellow-skinned race, but between all the softer and fairer features of this earth and the verdureless plains of Central Asia. The Zagi La was the lowest depression in the great Himalayan range of 300 miles, and by it all the traffic of Kashmir, the West Punjab, and Afghanistan passed into Central Asia. The road led through broad, stony, uninhabited valleys along the Dras River and through the open country of Dras, with its many hamlets peopled by hardy Dards and Baltis. Among mountains from 18,000 ft. to 21,000 ft. in height, the road led to the valley of the Suree as far as Kargil, the chief cluster of villages in the little Moslem State of Purik, part of Baltistan or Little Tibet, inhabited by Ladakh Buddhists who had embraced Islam. Up to Kargil the scenery was characterized by considerable verdure and vegetation, but after leaving that district the marches were over blazing gravel or surfaces of denuded rocks. It should be remembered that in Ladakh the valley bottoms were 10,000 ft. and upwards above the level of the sea, and the ranges left behind at the Zagi La intercepted the moisture, and the exceeding rarefaction of the air prevented it from holding any moisture in suspension. The water for irrigation was derived chiefly from the glaciers which occupied every hollow in some of the ridges, and occasionally, as in the Dras country, descended to 11,000 ft. The whole region, too, was swept by a regular dry wind from the south and south-west. As the winds blow with enormous violence, six pounds or more to the square foot, and as the highly rarefied air offered scarcely any obstacle to the direct transmission of the sun's rays, these were far more powerful than in the hottest parts of the plains of India. At Dizar, at a height of 14,000 ft., a solar heat was noted by Mrs. Bishop of 140°, and in another place it was 153 degrees, or only 32 degrees below the boiling point of water in the same region. But even in August the mercury fell every night below freezing point. The contrast between the Kashmiris and the Tibetans was very striking. The former were false, suspicious, and cringing, the latter truthful, trustful, and independent. Mrs. Bishop gave an elaborate account of the religious ceremonies and symbols of the people, by whom throughout she was treated with the greatest hospitality. She at last reached the Indus and crossed it by a wooden bridge where its fierce floods were narrowed by rocks to 65 ft. She then entered Ladakh proper. After an account of Leh, Mrs. Bishop described the adjoining district of Nubra, which is similar in general character to Ladakh. The central ridge between the Nubra and Upper Shayok valleys rises to 20,000 ft., and on it are imposed five peaks of rock, ascertained by survey to be from 24,600 ft. to 25,000 ft. During a considerable part of her journey Mrs. Bishop was conveyed by yaks, magnificent animals, which were frequently carved in temples and Oriental courts as emblems of dignity. She spent three weeks in Nubra. In an interesting account of the Buddhism prevalent in this region, she pointed out that the monastic life and celibacy imposed on 11,000 out of a population of 120,000 restricted the population within the limits of sustenance. In the course of her journey she saw patriarchal life in its simplest and kindliest form. Spending five weeks in the descent to the Punjab, journeying through Upper Kulu, and the interesting native States of Mandi, Suket, Bilaspur, and Baghat, she reached the amenities and restraints of the civilization of Simla.

Mr. Mackinder, (Reader in Geography at Oxford), moved a vote of thanks to Mrs. Bishop for her paper. She was, he believed, the first lady Fellow of the Royal Geographical Society. The motion was seconded by Mr. Ravenstein, and heartily accorded.

Dr. H. Schlichter, in "Some Notes on a New Method for the Determination of Geographical Longitudes by Lunar Distances," said that lunar distances as a means for the strictly accurate determination of geographical longitudes had been little used of late, partly on account of the splendid chronometers with which ships were now provided, and partly owing to the inaccuracies of the instruments commonly employed for lunars. For exploring expeditions on land, however, chronometers were of little value, and the other astronomical phenomena which might be used besides lunar distances were either too difficult of accurate observation by the majority of travellers, or occurred too seldom, or were not accurate enough. The author therefore introduces a new method of observation and measurement of lunar distances—viz., by obtaining a parallel series of photographs of the moon and a fixed star or planet on one plate, and afterwards measuring the distances on the plate. For the elimination of all possible inaccuracies of the photographic film or of the lens, the lunar distances thus registered are checked by repeatedly photographing on the same plate two fixed stars, the positions of which are given in the "Nautical Almanac," and the angular distance of which can easily be computed therefrom. The angular distances of the photographic lunars are then found by a simple proportion. The time for taking a set of eight photographic lunars on one plate does not exceed three or four minutes, and micrometic measurements show with perfect accuracy the change of the lunar distances (owing to the movement of the moon) during each interval of the eight observations. The minute accuracy of the method is hereby established. The micrometic measurements on the plate are made by means of the same *réseau* which is employed by the principal observatories for stellar photography, and the measurements may therefore be regarded as absolutely correct. Results thus obtained give the correct longitude of the place of observation. The author proposed to use this method for scientific expeditions into the interior of continents, etc., as well as for the further determination and correction of secondary meridians in navigation. For both purposes it was especially adapted on account of its minute accuracy and great simplicity.

In a paper on "Cadamosto and Early Exploration in Africa," Mr. Yule Oldham said:—At a time when public attention is being drawn by the means of Columbus celebrations to the great discoverers of the 15th century, it is fitting that renewed interest should be aroused in one of the most interesting of these, who has been called the Marco Polo of West Africa, and who forms a connecting link between the two great figures of Prince Henry the Navigator and Christopher Columbus. Alvise da Cadamosto was born at Venice in 1432. When only 22 years old he determined to go out into the world and make his fortune. Accordingly, in 1454, he sailed with the usual yearly fleet for Flanders. When off Cape St. Vincent contrary winds detained the fleet, and Prince Henry the Navigator, who was in the neighborhood, seized the opportunity to send messengers to try to persuade some of the Venetians to enter his service, holding out prospects of great profits and honor, especially as Venetians were skilled in handling spices, which he expected to obtain in the lands to which he was sending expeditions—a remark which shows that Prince Henry was confident of reaching the Indies round the south of Africa. Cadamosto was easily persuaded, left the Venetians, and, after passing the winter with Prince Henry, was sent out in the spring of 1455 in a new 90-ton caravel. On this expedition, after touching at the Madeiras and Canaries, and several places along the coast of the Continent, the mouth of the Gambia was reached. In the following year, 1456, Cadamosto made a second expedition from Portugal to the same region, but on the way, being carried out to sea by a storm, he discovered the Cape Verde Isles, the only group of West African islands which had never been discovered before the Portuguese voyages of the 15th century. Though Cadamosto made an important discovery, his real achievements are his writings. Being a foreigner, he was able, by returning to Venice, to leave his journals for publication, and not have them suppressed by the Portuguese Government. Accordingly they are to be found at the beginning of the celebrated collection of travels published at Venice in 1507, which was translated into several languages. He is one of the oldest travellers whose journal is preserved, and as he was a keen and accurate observer his writings are of the greatest value. They abound in careful accounts of the habits and industries of the negroes, and descriptions of the animals in the countries he visited. Mr. Oldham then pointed out how the accuracy of Cadamosto had been impugned by the late Mr. Major, who was misled by the writings of Lopes de Lima, and showed that Cadamosto's statements were of remarkable clearness and trustworthiness, and that he must be accepted as the first discoverer, in 1456, of the Cape Verde Isles.

Lieutenant H. Crichton-Browne described a journey in Matabeleland:—Having obtained 21 days' leave, I left Macloutsie camp at 6:30 A.M. on the 31st of December last, ostensibly on a hunting expedition, but with the intention of attempting to reach Buluwayo by a direct route across the veldt, and so obtaining information which, in certain eventualities, might prove extremely useful. My party consisted of six in all—myself, Sergeant Seal, who had been to Buluwayo by the White Man's Road, and was an excellent veldt man, my servant Anderson, and a native driver, forelooper, and boy. Following the Tuli road we crossed the Macloutsie drift, breakfasted on the bank of the Sepokwe river, and after a long ride, through an undulating country covered with mopani bush and varied by stony patches here and there, made our mid-day halt at the cross-roads on the Metzemashokami river, where stands telegraph post No. 316, marking about 16 miles from camp. On starting again, we quitted the Tuli road and line of telegraph posts on its way to Fort Salisbury, and, turning to the left, followed up an old hunting track which runs close to the Metzemashokami river This river, which we crossed and recrossed many times, contained plenty of water at the Tuli road, but as we ascended its course it soon became a mere chain of shallow pools. The track along its banks, which are covered with thick bush, was faint and difficult to trace, so that we advanced slowly and had made only another 14 miles, or 30 miles in all, when we halted at 8:30 P.M. between two kopjies at the eastern end of the Lipokoli hills. We passed at 5:30 a large, square-topped kopji on our right, and a little later we noticed a peculiar conical mound to our left. Near the latter we came on a party of Bushmen (not of the dwarfish sort) who, having failed to secure any game, were regaling themselves on a tortoise. These bushmen are nomads of the veldt, and spend their whole time in hunting. I was up at 4:30 the next morning, and, climbing the kopji to the right of our position, which was very steep, densely wooded, and adorned near its summit with three large baobab trees, watched the first sunrise of 1892. The scene was magnificent, and impressive to a degree too deep for words. Leaving Metzemashokami Port, as I have called our camping-ground, at 5:40, we followed the course of the stream, through thick bush and between two ranges of granite kopjies, and emerged from the defile, through which our course had been westward, at 7:15, and then turned to the north. Although the bush was less dense, we had great difficulty in following the track, which consisted of a single cart-rut, but we pushed along. After passing through a cloud of locusts, we reached the ridge, and by a gradual descent of about three miles came at 11:30 to the Shashi river, or rather its bed, for we found little or no water in it. After some inevitable delay, on Sunday, January 3, we started at 6:30 A.M., and, following the track of a single cart, slowly and with difficulty, through thick bush with stony interspaces, and round the end of a range of kopjies, at 10:30 sighted the Semokwi river, which has rocky banks and a stony bed at this point. On January 5 the first notable incident was that Sergeant Seal and I shot a fine cow koodoo, which furnished us with fresh meat, and an abundance of biltong. On January 6 we continued to travel through a picturesque and magnificent country, luxuriant in vegetation, and teeming with game, koodoo, steinbok, and dyker, and after spending the night in a lovely grass-plot, sheltered by trees, like an opening in the New Forest, we started on the 7th by crossing the river, from its left to its right bank, and endeavoring to find a way through a beetling range of kopjies. But we were baffled in the attempt, and so had to retrace our steps and again cross the Semokwi at a point about five miles higher up its course. Friday, the 8th of January, began badly, for two of our horses had strayed, and it took some time to find them; but the weather was brilliant, and we started at last in good spirits, skirted a large kopji, and entered the range of which it is the leader, through very thick bush at the port discovered by the boy. During our mid-day halt a cloud of locusts passed over us on its destructive mission, and it took exactly two hours to pass. At 3:30 we went on up the gorge, crossing to the left bank of the river which watered it, and after about an hour came out on a long reach of open country very fertile and fair to look upon. At this point loud yells and shouts sounded from the opposite side of the gorge and on turning round I saw fully a hundred natives rushing down the bank and making straight for me. In a moment I was on my horse, and then stood still as a rock. On they came, with a free, swinging movement, and it was a fine sight, even with all its peril. They were stalwart fellows, tall ebony savages—the finest specimens of African natives I had yet seen, and they displayed a sort of fiendish energy as they ran along, hullabalooing at the top of their voices, and rattling their assegais against their shields. I confess to a feeling of inward sinking for a moment, but I knew that my safety depended upon my maintaining external coolness, and so I remained imperturbable, until I distinguished immediately in front of me, to the right, an Induna or Ring-kop (leaders amongst the Matabele wear a black ring on the head), who was particularly violent in his objurgations; and on him I fixed my eye, and smiled. When I first smiled on this Ring-kop Matabele he was the picture of savage rage; as I went on smiling he mollified, and as I smiled again and again he broke into a hoarse laugh. It was a hoarse laugh, but I think I never heard a jollier one, and immediately I followed up my advantage. Still smiling and nodding at him, I said, in loud but conciliatory tones, "The compliments of the season to you, Mr. Ring-kop; I hope I see you very well." My English tickled them. Their curiosity was getting the better of their anger, and so I at once directed their attention to my companions, who were behind with the cart, and to Seal, who had been down at the river getting a drink when I was surrounded, and who must have taken a very long drink, for he was still apparently engaged in it when sent for. The whole of my party was soon brought up to where I was standing, and the work of interpretation, through the cart-driver, then commenced:—"Where were we going?" "To Buluwayo." "What to do there?" "To see Lobengula." "Why had we left the White Man's Road?" "Because we had lost our way." "Were we not afraid to travel on the veldt?" "No, why should we be afraid?" "Because there are but three white men, and we are in hundreds;" and so on, the result of the conclave being that our captors became quite friendly. The sudden alternations of feeling in the natives of Africa are very remarkable. A lot of men who had been threatening and blackguarding us were pacified in a few minutes, and agreed to take us to their kraal, not as prisoners, but as guests. Whether, as regards its scenery, its vegetation, its game or its men. Matabeleland is by far the finest and most attractive country that I have seen in all my South African wanderings, and I am inclined to think that its mineral wealth may yet be found as superior as its organic products. I was anxious to start early on the 9th, but thought it prudent not to be in too great a hurry. At 7:30 we were away with an escort of 30 men, with the Ring-kop or Induna of the kraal in command and in company of another Induna, who had been sent there to collect taxes for the King. At 10 o'clock we reached the road to Buluwayo, and I then cantered ahead, but soon saw a dozen or 15 men seated on some rocks in front of me. I pulled up and waited for the others, when I learned that it was necessary for us to have an Indaba, or conference, with the Chief Induna of the district, he of Manyami. We all sat down beside this Induna and his head men, amongst whom were five ring-kops, and had a palaver. The Indunas looked very serious and sapient, and interrogated us on various points, especially as to our business with Lobengula. When told that we sought permission to attend the great dance, and were not concession hunting, they seemed satisfied, and said, "All right." On the 11th we started at 6 o'clock, and wound up the Nek leading to the elevated plateau on which Buluwayo stands. Our mid-day halt was at Mabokotwani, 20 miles from the lower entrance to the Nek, situated near the point where two streams converge to form the Guai river. which flows into the Zambezi. So we knew now that we were on the watershed whence streams flow southward to the Limpopo and northward to the Zambezi. In the afternoon, at 6:45 P.M., we crossed the Khami, and noticed that the country was becoming much more thickly populated, as we passed numerous kraals of larger size than we had before seen. It was about 2 o'clock on January 11 that we came in sight of Buluwayo, the capital of Matabeleland, a city set on a hill, but of no very imposing appearance. In order for me to obtain an interview with the King, the far-famed and much-feared Lobengula Mr. Tainton, who acts as Government interpreter, rode out on the afternoon of my arrival to Umvoochwa, a kraal at the distance of six miles from Buluwayo, where the King then was on one of his customary rounds. For Lobengula rarely occupies the mud-house in his capital, but moves about from kraal to kraal in the surrounding country, his 79 wives being distributed amongst these kraals. Happily Mr. Tainton brought back a favorable reply, and on the following morning, rigged out in the best that my slender wardrobe afforded, and accompanied by Mr. Acutt and Sergeant Seal, I rode over to Umvoochwa, meeting on the way two of the King's wives, with a small train—one, the head wife, of a yellow complexion and very ugly; the other, one of the Gaza Queens, named Intele, black, but with regular, well-cut features, and, I should think, of Arab blood. As for Lobengula himself, all I can say is that he is a very jolly old colored gentleman, with a broad, good-natured countenance, capable of unpleasant contortions, no doubt, but still good-natured on the whole, and with a huge and unwieldy body. He has comparatively small hands and feet and an air of dignity that distinguishes him from even his highest Indunas, and marks him out as being every pound a King. Lobengula is a gentleman, and not, as has been affirmed, repulsive in appearance; and I would now add, as the result of all I heard and saw in Matabeleland and all I have gathered from other travellers there, that he is friendly to the English, and has repressed the hostile feelings of many of his subjects toward us, sometimes in a rather summary way. As long as he lives and reigns we shall not, I believe, have war with Matabele, for he has steadily resisted all appeals for permission to fight the white men; but when he passes away or loses the reins of government, trouble is not unlikely to arise. Lobengula has had a difficult position to hold, and could his biography be truly written it would contain incidents not less thrilling than those described in Mr. Rider Haggard's novels. I started on my return journey at 7:30 on the morning of January 14. After three days of 40 miles on each day, we reached Tati at 9:30 P.M. As we arrived so late I did not care to disturb the residents at Tati that night, so we went down by the river, knee-haltered our horses, rolled ourselves in our blankets, and went to sleep. Next morning we were hospitably received by Mr. Farley, manager of the Tati Concession, and by Messrs. Burn and Murphy and Major Maxwell. Here we rested for a day, feeding on the fat of the land and finding the means of æsthetic enjoyment as well as of bodily refreshment, for even in this inaccessible spot we encountered an enterprising American organ. Recruited by a day's rest, but delayed in the morning by heavy rain, we got away from Tati at 9:55 A.M. on January 18, crossed the Tati and Shashi rivers, and the Macloutsie river at a point where there is a police station, occupied by four men whose duty it is to take note of all wagons that pass, and to prevent the unauthorized importation of guns and ammunition into Matabeleland; and, after 6 o'clock, struck the Selebi, which we crossed at the drift and followed along its south bank until torrents of rain compelled us to pause for the night in the middle of the veldt. And a soft night it was, as they say in Scotland. The rain came down in sheets, and streamed over us as we sat on our packs. On January 19 our course lay along the Macloutsie river, on which there are many cattle posts, and took us across the Gokwi, a sand river, and still a sand river, notwithstanding all the rain of the previous night. That night we slept at the half-way station, as it is called, where we found some policemen on duty, and next day, January 20, still following the Macloutsie, we rode on to the camp, which we reached at 8:30 P.M., having travelled the distance from Tati, 120 miles, in three days, and the whole distance from Buluwayo, 240 miles, in six days' riding. I got into camp 12 hours short of the expiration of my leave, and on arriving there found that Captain Sitwell, of the Northumberland Fusiliers, with a small party had started four days previously on exactly the same expedition which I had just completed, an expedition which he also successfully accomplished. It would be rash to predict the future of Matabeleland, but what I have said of its beauty, fertility and resources—and every traveller who has visited it has testified to the same effect—creates the hope that when, in the inevitable march of events, the sceptre slips from the black hand it will be grasped bv the white hand of Great Britain. The climate of Matabeleland is pleasant and salubrious. Its soil is deep and rich, capable not merely of feeding a teeming resident population, but of supplying to other countries many much-desired products of vegetation. And that soil is threaded with reefs probably as fully charged with gold as any others in South Africa. Matabeleland has a great future before it, a future which will begin whenever easy pathways of communication with it are opened up. When occupied by European settlers it will yet play an important part in the world's history.

Mr. Theodore Bent's paper on Mashonaland, though assigned for cause to the Section of Anthropology, belongs quite as much to that of Geography. He said:

The inhabitants of the newly-opened-out country in South Africa, which has, some how or another, got the name of Mashonaland, are an oppressed and impoverished race of Kaffirs, raided upon by Zulus on the one hand under Lobengula, and on the other hand under Gungunhama. They now dwell amongst the rocks and crannies of the mountains, whither they flee at the approach of the enemy, and look down upon the destruction of their homesteads and the robbery of their cattle. They are obviously a race which has seen better days, retaining amongst them traces of a higher civilization in their skill in smelting iron, their ornaments, their musical instruments, and many other kindred points. During our stay amongst them last year for a period of seven months we had an opportunity of closely studying their characteristics. From the Lundy River on the south, and northwards towards the Zambezi, the inhabitants, though of different tribes, all call themselves by one race name, and this name is "Makalanga." "You will find many Makalanga there," was the encouraging reply to inquiries, when we started off on our trip to the Sali River, an unexplored region. The probable derivation of the name is Ma-Ka-Langa, an Abantu word, signifying "children of the sun." This name did not convey much to me until, on my return to civilization, I read the works of early Portuguese travellers, and in the account of Dos Santos, written 300 years ago, who, by the way, is almost the only Portuguese writer on the subject of this country who does not indulge in extravagant exaggerations, I found to my astonishment the following statement: "All these Kaffirs they call Mocarangas because all talk the Mocaranga language," and again: "Monomatapa and all his vassals are Mocarangas, a name which they had because they live in the land of Mocaranga, and talk the language called Mocaranga, which is the best and most polished of all Kaffir languages which I have seen in this

Ethiopia." Here we have the same name as Makalanga. We can fairly assume that the Makalangas are the descendants of the once powerful organization known in the 16th century as the empire of Monomatapa, a powerful Kaffir organization like the Zulus of to-day, which fell to pieces first of all by internal dissensions, and finally became a prey to the Zulu hordes who fell upon them. In 1720 a tribe of Makalanga's entered Natal with traditions of having once belonged to a powerful tribe further north. Hence the country should be called Makalangaland. For the origin of this race of Makalangas and the growth of the Monomatapa power we are naturally much more in the dark, yet certain Arabian authorities are fairly explicit on the subject, and prove to us that barbarous tribes similar in habits and customs inhabited this gold-bearing region as far back as the ninth century A.D. In the descriptions given by the above-mentioned authorities of the manners and customs of these tribes we recognize certain salient features which connect them with the present race. They describe to us the tribal witch-doctor, the ancestor-worship which is still carried on, their methods of catching game, the filing of their teeth, and numerous other customs indubitably connecting them with the present race. Hence it is very clear to us that the country now called Mashonaland has been inhabited for at least a thousand years by the ancestors of the present barbarous race, a race of men who at one time became powerful and almost civilized, owing to their intercourse doubtless with foreign traders, but who, during the later centuries have fallen away into their natural state of barbarism. It is impossible in the limits of this paper to go into anything like detail concerning the anthropology of this race, their customs and habits as we saw them during our stay in their country. I will confine myself, therefore, to one point—namely, the various customs amongst them which connect this people with external races, and point forcibly to a Semitic influence having been exercised upon them. First, in connexion with their chiefs and their succession. Each chief in Mashonaland, whether great or small, paramount or vassal, has a dynastic name or tribal appellative which he assumes on inheriting the chiefdom, dropping the name by which he was previously known. Such names are used just as the name Pharaoh was used in ancient Egypt and continue for centuries. Each of the Makalanga tribes has its totem. In M'Topo's country it is the lion into which the spirits of their ancestors are supposed to go, and this animal is believed to fight for them in battle. To the lion they sacrifice annually, and the chief priest of the tribe is called the Lion priest, the Mondoro. Other tribes have the crocodile, the leopard, and so forth. Totems of similar nature are found, as Professor Glover demonstrates, amongst the tribes of Southern Arabia in remote antiquity. In religion the present inhabitants of Mashonaland are distinctly Monotheists. They believe in one god whom they term *Muali*, a great and mysterious personage unapproachable by mortals ; so they have elected as their intercessors *Mozimos*, or spirits of their ancestors, to whom they sacrifice annually and offer prayers for their well-being. The existence among the Makalangas of a day of rest during the ploughing season is very curious. They call it "Muali's" or "God's day." In Mangwendi's country the chief ordains it and orders that his tribe abstain from work on every sixth day during the periods of industry. This day is invariably employed by the men in drinking beer and lying about idle on the rocks. When an individual wants any work done he makes an unusually good brew of beer and summons his neighbors to help him. Hired labor is unknown amongst them. In a similar co-operative fashion work is done still in many of the remoter parts of the Turkish Empire. The wooden pillows of which every Makalanga has one on which to rest his decorated head at night, are exactly the same in shape and execution as the wooden pillows found in ancient Egyptian chambers, specimens of which are to be seen in the British Museum. These pillows are found also amongst other tribes in South Africa, and point to a northern influence. The universal game amongst the Makalangas is one called by them Tsufuba. It is an exceedingly perplexing one. Outside the village, on a level space, 32 holes in rows of four are made in the ground. Around these sometimes as many as ten men group themselves, moving from hole to hole small stones or bits of potsherd in what to us was an unaccountable manner. The game is evidently closely akin to a game played in India with beans and holes in a wooden platter. The common drink of the country is the Kaffir beer, made of milletmeal. It is called in some parts of the country *Doora*, which is also the name given to the same material in Abyssinia. This drink was in common use in Egypt and Asia Minor in classical times, and Xenophon mentions how he and the ten thousand drank of it in villages in the mountains of Armenia. The so-called Mashona piano, consisting of over 20 iron notes fixed to a scale on a square piece of wood and played on a calabash to bring out the sound, has its parallel to-day in Nubia and Lower Egypt. The Makalangas are decidedly a musical race, and easily pick up tunes to play on this instrument. Every chief has his private musician, who plays at all the public entertainments and dances. As to type of countenance, the Makalanga is far the most refined of any of the Kaffir races I have seen. The thick lips, snub nose, and large nostrils so characteristic of the Bechuana, the Zulu, and other South African races are the exception and not the rule amongst the Makalangas. Many of them have thin lips, aquiline noses, and delicate features. Their manners are courteous in the extreme. Some of the chiefs whom we visited received us with the grace and dignity of an Arab sheikh. When we gave a present, however small, the recipient would touch the chest before taking it into his hands. If he is a cowed and cowardly man the Makalanga is refined and bears ample evidence to his once having been in a superior state of civilization and having had intercourse with more civilized races. There is gold in the country which may be worked if plant, prospecting, and communication be proceeded with. The point is, Will all this be done in time to compete with other gold-fields of the world? In agriculture there are good prospects; the natives grow everything by merely scratching the soil. The climate will be good, but it will be long before the country will be fit for cattle.

YEMEN.—Mr. Walter B. Harris, in a paper read before the British Association in August, gave an account of a journey made by him in Yemen in the beginning of this year, during the Arab rebellion against the Turkish Government. He left Aden in January with one servant and a guide, and after crossing the desert, reached Kateba, the Turkish frontier town. He was in disguise and obtained a permit to pass on, but was in such danger that he travelled only by night and lay hidden during the day.

The whole distance to Sana, the capital, 300 miles, was accomplished in 19 days. At Sana he was arrested and imprisoned, and after five days was sent under guard to Hodeida, on the Red Sea. This journey of nearly 200 miles took five days.

Mr. Harris found Yemen to be a wonderfully fertile country, well supplied with water, and the great plateau, which is from 7000 to 9000 feet above the sea, very well cultivated.

He has reason to congratulate himself on his return from such an expedition.

ARTHUR CONOLLY'S JOURNAL.—In the autumn of 1840 Capt. Arthur Conolly started on a mission from Kabul to Khiva and Khokand, and visited Bokhara, where Col. Stoddart was detained by the Amir.

In December the two Englishmen were confined in a noisome prison, where they remained for six months, when they were taken out and publicly put to death. The story is told in Kaye's *History of the War in Afghanistan*, Vol. III., pp. 235–263.

It is announced, in the *Proceedings* of the Royal Geographical Society for September, that part of Capt.

Conolly's Journal on the occasion of his expedition has just been printed at Simla.

"The journal, which is in the form of two letters, addressed to Sir William Macnaghten at Cabul, deals, first, with the journey across the mountainous and little-known Hazara country (the scene of the present rebellion against the Amir), as far as Merv, and, next, with the transit across the desert and the negotiations with the Khan at Khiva. The former has considerable geographical interest, the region of the Upper Murghab and Hari Rud Valleys having been almost unknown till re-explored by Captain the Hon. M. G. Talbot in 1885–86, while the latter, which is principally in the form of dialogue between the Khivan Khan and Conolly, sheds a very clear light on the Central Asian politics of those days. It will be remembered that Conolly, after visiting Khiva, repaired to Bokhara, where Stoddart was in durance, but was unable to rescue his friend or even to save himself, both officers being put to death by the Amir after months of imprisonment and suffering. Captain Grover and Sir John Kaye succeeded, in their respective works, in throwing much light on the Bokhara tragedy, the chapter in the 'Afghan War' of the latter author in particular being one of the most thrilling in the book. There is one episode, or rather sequel, to the story which remains to be cleared up, and that is the fate of Lieutenant Wyburd, of the Indian Navy, who was despatched from Persia to discover the fate of Stoddart and Conolly, and who was reported to have been seized himself and sold into slavery. Wyburd is believed to have escaped from slavery and reached Khokand, where, however, he was again seized under suspicion of being a Russian spy. The Khan of Khokand sent a native agent to Peshawar, stating that an Englishman, calling himself 'Wypart,' had reached that State, and that he would be released if any officer were sent to identify him as a British subject. Volunteers were not wanting for the task, but the Government of India preferred, from motives of caution, to send a native agent, whose mission, however, ended fruitlessly, for nothing is believed to have ever transpired regarding Wyburd's fate."

DAUVERGNE'S CENTRAL ASIATIC EXPLORATION.—M. Henri Dauvergne contributes to the *Bulletin* of the Paris Geographical Society (1er Trimestre, 1892) an account of his journey to the Pamir in 1889 by way of Ladakh and Yarkand, and back to Kashmir by a *détour* to the west and south.

The march from Srinagar to Ladakh occupied 15 days, and 21 more were spent at the latter place in the preparations necessary for crossing the mountains, which did not even furnish grass for the horses. The party of five left Ladakh, July 13, and the next day reached the Kardong Pass, at a height of 17,400 feet. A difficult descent led to the Shyok river, which was crossed by swimming the horses, and 40 miles beyond was the Pass of Karawal-Dawan, 14,633 feet in elevation.* Beyond this pass was the Sasar-la chain of mountains with peaks from 20,000 to 22,000 feet high, and vast glaciers. The approach to the Sasar Pass was lined with the bones of horses that had fallen by the way. The pass, which is at an altitude of 17,815 feet, is long and difficult, and is much dreaded by the caravans going from Yarkand to Ladakh. Below the pass the Shyok river was crossed again and three days' journey brought the party to the Depsang desert, where the line of the road is indicated by the bones of horses. At the Karakoram Pass, 18,317 feet above the sea, M. Dauvergne paused to fulfil a pious duty.

At a spot about 300 feet above the pass his friend Dalgleish had been murdered in March, 1888, and there M. Dauvergne set up a truncated pyramid, supporting a white marble pillar with this inscription in Arabic and English: "Here fell Andrew Dalgleish, assassinated by an Afghan."

On the slope of the Karakoram the travellers killed several snow antelopes (*Kemas Hodgsonii*), an animal which is not found at a lower elevation than 16,000 feet. The next pass was the Suket, 18,137 feet in height, and after crossing this M. Dauvergne halted for some days on the banks of the Karakash river. At Sanju-Kurgan the road forked to the north-west and led up the course of a torrent which descended from the Kuen-lun chain till the Kilian Pass, 17,340 feet high, was reached.

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* The text reads: 1460 *pieds d' altitude;* but the list of passes and the map agree in assigning to the Karawal-Dawan a height of 4460 mètres.

This is on the frontier of Chinese Turkistan, but there is no post, and M. Dauvergne pushed on to Namlung, at the entrance of the valley of the same name.

In order to avoid possible difficulties with the Chinese officials, the direction of the route was changed to the west, and the first halt was made at an encampment of Wakan Kirghiz, people of Aryan race, with regular features, and very hospitable, notwithstanding their poverty. A second encampment of this tribe was found beyond the Namlung Pass (12,100 feet high), and here M. Dauvergne learned that he had yet five passes to cross before reaching the Koghiar valley.

These passes were the Saraghat, 13,200 feet, covered with the *loess* from the Desert of Gobi; the Tuslar Dawan, 14,600 feet; the Tupa Dawan, 15,400 feet; the Sanitch Dawan, 16,000 feet; and the Kitchikim Dawan, 15,800 feet. Below the Tupa Pass a little river flows to the north through a great cleft in the second parallel chain of the Kuen-lun.' This chain, though its peaks are from 16,000 to 19,000 feet high, is not indicated on any map; it is traversed by streams which flow into Lob Nor. After crossing the Kitchikim Dawan, which has two ridges, the party met two Russian soldiers, mounted on camels, and learned that Colonel Pievtsof was not far off. M. Dauvergne visited the Russian camp and found that Pievtsof had come from Kashgaria and was on his way to the tableland of Chang-Thang from which he meant to push as far as possible towards Lhasa.

A day's march from the Russian camp M. Dauvergne met Maj. Cumberland and Lieut. Bower, who had started with him from Ladakh. They were bound for the Tagdumbash Pamir, and turned to the north-west. M. Dauvergne continued his march to the west-south-west, over the Takta Dawan Pass, among the outliers of the Kuen-lun chain, to Egizarak Kurgan, a little fort occupied by Turkis, in the Chinese service. These men were smelting copper by a primitive process. The ore was mingled in the furnace with pounded coal, on which charcoal was laid; a man then plied a pair of goatskin bellows till the coal was consumed, and the metal was found in a crucible at the bottom of the furnace. This copper is sent to Yarkand, where the Chinese coin it into *cash*, each with a square hole in the middle.

At Langar (the word means *confluence* or *junction*) it became necessary to cross the Zerafshan river on a raft made of skins and towed by a horse. The raft was tied to the horse's tail and one of the guides held the head of the animal and directed him. The operation was repeated several times without accident.

On the left bank of the Zerafshan the party came to the Tung valley, a warm and fertile district inhabited by a vigorous, handsome race, very hospitable and friendly.

From this valley the route led over the Kotli-Kandar Pass (16,350 feet) into the Mariom Pamir and the Sarikol valley. After passing the Ogriart Dawan (13,050 feet) the Tagdumbash Pamir was reached. Here M. Dauvergne expected to secure some specimens of the *ovis Polii.* An Aksakal Kirghiz chief informed him that an Englishman, Capt. Durand, with a force of

50 sepoys, was among the Kunjuts and that these mountaineers were paid to close their passes against Russian explorers coming from the north. The Kunjuts, seeing their opportunity, reported at Yarkand that they had beaten the English, and asked for help in arms and money in order to repel a more serious attack ; and the story ran that the Chinese had sent eight horses, laden with muskets, powder and money. It was said also that Capt. Grombchevsky had reached Aktash from the west.

It is quite as perilous to hunt the *ovis Polii* as the chamois, and M. Dauvergne was several times in danger of losing his life. The snow began to fall in abundance (it was the end of September) and he decided to turn towards the little Pamir, so as to reach Gilghit. At the Wakiji-Kul Pass (15,600 feet) a heavy snow-storm threatened, and the party descended in all haste to the wide bed of a river which issued from three enormous glaciers and flowed towards the west. M. Dauvergne was satisfied that this river was the Oxus (Amu-Daria). The water was very low in the broad bed, which was followed for 21 miles to Gombaz, where the river took a sudden turn to the west-south-west. Beyond this point was a pass that led into the Great Pamir, and farther along the plain disappeared and the stream found its way among rugged mountains. The first village was Serhad, with many of its houses in ruins. Towards the south appeared the snowy peaks of the Hindu Kush.

A square turreted fort, built on a rounded hill, commanded the right bank of the river, and here, also

> The shorn and parcelled Oxus strained along

through the pebbles and the sand that filled its bed.

M. Dauvergne argues that he has settled a doubtful question. It is a mistake to suppose that the Oxus rises in the Gaz-Kul and curves around Aktash, to become an important stream after receiving the Murghab, which flows from the Kara-Kul. The Kara-Kul gives rise to no river. A little stream, the Ak-Baital, augmented by another from the Usbel and the Rang-Kul, joins the Ak-su and then, under the name of the Murghab, flows toward the west and unites with the Oxus at Kila-Wamar in Shignan.

The first week in October M. Dauvergne was detained for several days, waiting for the permission of the Afghan authorities to proceed by way of the Baroghil Pass, the second gateway to India, after Herat, and practicable for mountain artillery. Impatient of the delay, at last, the party pushed on to the Ishky-Kul lake, 14,030 feet above the sea; its outlet flowed to the south, where a valley opened, and in that direction lay Gilghit. A heavy snow fall had blotted out the paths, and after two hours' search for the way M. Dauvergne found himself at the foot of a glacier 160 feet high, which blocked the river. After three hours' hard work this glacier, estimated at three miles in length, was turned, and the party encamped on the mountain side. M. Dauvergne had forgotten to protect his eyes with blue glasses, and a painful attack of snow-blindness detained him for three days.

He describes the passage of the Karumber valley as the hardest journey he ever made; but the route beyond was comparatively easy, and he reached Gilghit about the middle of October and Srinagar on the 8th of November.

The whole distance travelled in six months was about 1600 miles; 27 passes were crossed and 12 rivers.

M. Dauvergne has established, he thinks, several geographical points:

1. That there is a second chain, parallel to the great chain of the Kuen-lun on the north, facing Kashgaria;

2. That the river in the Tung valley is an affluent of the Zarafshan and not, as the Russian maps indicate, a tributary of the Taghdumbash river;

3. That the sources of the Oxus are in E. Long. 75° (Greenwich) and N. Lat. 37° 10′, and not in the Gaz-Kul, and that the river flows from the great glaciers of the Hindu Kush, to the north-west of the Kilik Pass;

4. That the Karumbar valley, though difficult, is accessible, M. Dauvergne having crossed it, coming from Wakan with a caravan of ten horses. He insists on this point.

A native "Surveyor," in the English service, represents that the waters of the lake Ishly-Kul flow towards Mastij in the Chittral country. M. Dauvergne found that the outlet of the lake was the Karumbar river, an affluent of the Yasin.

RUSSIAN EXPLORERS IN ASIA.—M. Venukoff has laid before the Paris *Société de Géographie* the following notes on the Russian geographical work in Asia:

Explorations are being made in the northern part of the Ural Mountains.

Mr. Bogdanowitch is making a geological examination of the Altai Mountains, to find the best beds of coal to supply the Trans-Siberian railway, now under construction.

Some reports have been received from Mr. Tchersky, who was sent by the St. Petersburg Academy of Sciences, in 1891, to make a scientific exploration of the country watered by the upper course of the Yana, the Indigirka and the Kolima.

An expedition under the well-known traveller Grum-Grijmailo will be sent, under the auspices of the Russian Geographical Society, into northeastern Mongolia.

Another expedition has been organized by the same Society for the exploration of two provinces of western China, Kan-Su and Sze-Chuen, and eastern Tibet. Messrs. Potanin and Berezovsky are in charge of this exploration; and two former companions of Prejevalsky, Messrs. Roborovsky and Kozlof, are engaged in central Tibet.

The researches into the ethnography and topography of the Pamir are directed by Mr. Yonof.

The naphtha springs and sulphur deposits of Turkistan are under examination.

A small island, or rather a rock, which has recently made its appearance in the Caspian Sea, not far from Baku, was at first reported to be an enormous aerolite.

THE SANGIR ERUPTION.—Mr. Sydney J. Hickson, in the following letter to the London *Times*, gives an account of the island of Great Sangir, said to have been destroyed by the eruption of the Awu volcano on the 7th of June last:

> Sangir, or "Great Sangir," as it is more frequently called by the natives of the Archipelago, is the largest of a chain of volcanic islands that connects the northern peninsula of Celebes with the southern point of the island of Mindanao. The islands, rising abruptly from the floor of the very deep Celebes sea—a depth of over 2,000 fathoms was found by her Majesty's ship *Challenger* quite close to Great Sangir—are very mountainous and covered by dense tropical forests.

The islands Ruang and Siauw are both little more than volcanoes standing in the sea, but Sangir is a large island 25 miles long by about 15 miles broad, with undulating hills and valleys occupying its southern half and the great Awu volcano and its slopes the greater part of its northern half.

When I visited the islands in November, 1885, the Ruang and the Awu were quiet, but the Siauw was sending out dense volumes of smoke that varied little in density from day to day.

From the accounts I received from the natives and from the records of the islands in the Dutch books of travel, it seems that the Siauw volcano has never been very violently active, but both the Ruang and the Awu have a history full of most terrible and heartrending episodes. Of the Ruang I need not say much. The last serious eruption occurred in 1871, when at least 400 persons lost their lives either by the sudden rise of the sea water that accompanied the eruption or by the showers of stones and ash. Of the Awu volcano we find recorded in Valentijn's "Oud en Nieuw Oost Indien" that a most terrible eruption occurred which lasted from the 10th to the 16th of December, 1711. Sjamsialam and his son, the Princess Lorolabo and her daughter Sarabanong, and over 2,000 people of the kingdom of Kandahar were killed. On March 2, 1856, there was another fearful eruption, which lasted until March 17 and destroyed nearly 3,000 human lives. The streams of boiling water and of steam which poured down the mountain slopes rather than the flow of lava caused the enormous mortality of this second eruption. After the eruption of 1711 it seems that a large lake of water was formed in the crater, and a certain privileged class of Sangirese were allowed by the gods to visit this lake every three or four months to test the water with their rice. If the water was hot enough to cook their rice they took it for a sign that an eruption would shortly follow. The great eruption came in 1856. The waters of the lake began to boil, burst their banks, and flowed down the sides of the mountain towards Tabukan and Taruna, causing immense destruction of human lives and property.

Concerning the present eruption we learn very little at present, but it seems to me very improbable that the whole island has been destroyed, and, from the sparseness of the population on the slopes of the Awu, it is also very improbable that so many as 12,000 persons have lost their lives.

The population consists of one Dutch Controlleur, who may possibly be married, some three or four German missionaries with their wives and children, one or two European traders, a few Chinamen, and the remainder Sangirese Malays. The island is governed by five native Rajahs, who are advised by the resident Dutch Controlleur. For many years there has been no war or other disturbance, but the island, notwithstanding the richness of its soil, is not in a very prosperous condition. The only produce of any importance is copra, but some good ebony and other timber is found in the forests that cover the island.

SYDNEY J. HICKSON,
Author of "A Naturalist in North Celebes."

DOWNING COLLEGE, CAMBRIDGE, July 18.

THE BEND OF THE NIGER.—Mr. G. Vasco has a paper, in the *Revue Française*, of July 15, on the population and the religions of the Niger country. His principal authority is Capt. Binger, whose explorations enabled him to make estimates, confessedly imperfect, of the comparative density of population in the various native States.

The greatest density, 20 to 25 persons to the square kilometre,* is found on the Ivory Coast and in Mossi, in Hausa, Yoruba and Dahomey. Along the Senegal river, in Futa and Futa Jallon, in French Guinea, in Macina, the States of Sultan Tieba, and the Kong country, there are 15 to 20 inhabitants to the square kilometre.

On the Comoë river and in Ashanti the number falls to 12 or 15; and in Gambia, the Upper Senegal and the left bank of the Niger, to 10 or 12. In the States of Samory, in Bobo Diulasu, Salaga and Gurma, the density varies between 6 and 10; and it sinks yet lower (1 to 5 per sq. kil.) in central Senegal, which is almost a desert, in Segu and in Gurunsi, on the upper waters of the three Volta rivers.

This scanty population, says Mr. Vasco, is the result of the bloody wars waged against each other by the native rulers. The more peaceable countries, such as Futa Jallon and Kong, are among the most populous, while Wassulu and Segu, which are constantly at war, are nearly depopulated. The remark is sound, but it offers no explanation of the fact that Dahomey, surely not a peaceable State, is credited with a higher ratio of population than Kong.

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*53 to 65 per square mile.

To quote Capt. Binger : " The question is so much the more grave that, once the native population is destroyed, the development of the country will become impossible for the white man."

History seems to show that much depends upon the manner of the killing, and that when this is the skilful work of the white man himself the way is made plain for a prosperous development.

Capt. Binger's map of the religions in the Niger country, reproduced by Mr. Vasco, shows that fetishism is still absolute along the Gulf of Guinea from Sierra Leone on the west to Benin on the east, and from Timbuktu to Mossi. Everywhere else Mohammedanism, firmly established at commanding points, has permeated and is breaking up the native beliefs. The ultimate triumph of Mohammedanism is assured, and this is a matter of serious concern to the Europeans, who have found their most dangerous enemies in the Mussulman rulers,—El Hadj Omar, who was overthrown by Faidherbe, Ahmadu, Muniru, Samory and Mahmadu-Lamin.

SOME FRENCH EXPEDITIONS IN AFRICA.—M. Monteil, who started, April 15, 1891, for Wagadugu in the bend of the Niger, marched without hindrance as far as Ponsa, where he found the country suffering from a cattle-plague which spared, he says, hardly one beast out of a thousand. He was well received at Dore, the capital of Liptako, and the centre of the salt trade in this part of the Niger country. His next stage was Zebba, where he fell sick and remained nearly a month. At the end of July he reached Say, on the Niger. From this place he took the direct route to Lake Tchad through Gurma, Mauri and Kebbi, three districts in which the caravans were constantly pillaged by the inhabitants. After many losses by theft, the expedition arrived successively at Dosso, in Gurma, and Ginwae, in Mauri, and reached at last Argungu, the capital of Kebbi. Seventy-five miles to the east was Sokoto, which was reached about the middle of October. This town, which covers a very large space, is enclosed by a mud wall, and much the larger part of the town is occupied by fields of millet. There was no trade, and the inhabitants, ruined by the cattle plague, were in great distress.

Beyond Sokoto, at a distance of 20 days' march, was Kano, and here M. Monteil arrived November 25. Kano, defended by an enclosure 26 feet in height, was built of large square houses of dried earth. Its streets were broad and clean and there was abundance of water. The place is an important market and is supplied with every sort of European merchandise. There were many Arab slave-traders from Constantine and Tunis and still more from Tripoli. The caravans from the Mediterranean make this point their terminus.

From Kano M. Monteil was to continue his march to Kuka, in Bornu.

Lieut. Mizon, who arrived at Bordeaux in June, makes a brief report of his journey from the Benue to the upper Sanga. He was well received at Yola by the Sultan of Adamawa, and passed on to Ngaundere, where he turned to the south-east, across a succession of fertile plateaux on which grows excellent grain and where the temperature goes down to zero (32° Fahr.). It was then January. A number of small streams united in this region to form the Kadei, and Lieut. Mizon descended this river to Yambala and beyond it to the confluence with the Mombere, where he met M. de Brazza, and the two explorers remained together three days. Lieut. Mizon continued his voyage, down the Sanga and the Congo. In the country below Ngaundere he passed through the territory of Tibati, an important chief whom no European had previously visited. On the Bumbi, the central branch of the Sanga, he fixed the position of Gaza, a great trading place, hitherto known only by report.

The eastern branch of the Sanga is the Mombere, the western the Kadei, and Lieut. Mizon places the Sanga among the important affluents of the Congo, after the Ubangi, the Kasai and the Lomami. The Kadei, which he regards as the main stream of the upper Sanga, rises in about 6° 30′ N. Lat.

L'Afrique Explorée et Civilisée quotes from the *Journal Officiel* M. de Brazza's report of his negotiations with the Mohammedans north of the Upper Sanga. "One of our Senegalese," he says, "the marabout Ibrahim Nieng, whom I had sent to reside near the chief Yambala, has forwarded to me a message from Abu ben Aïssa, a chief who enjoys a great religious influence and exercises a serious political control over a wide region. He lives 15 days' march to the north. His letter is countersigned by Sidi ben Mussa and Abdallah ben Ibrahim, the one a Hausa, the other of Fulbe race. The letter came through an agent of the Fulbe. This agent acted with the greatest circumspection. He arranged several preliminary interviews with my Senegalese in different villages, and only made himself known and delivered the message with which he was charged when he recognized in my marabout Ibrahim, with the Koran before him, a lettered Mussulman.

"The envoy himself was able to read Arabic with fluency. The message was to inquire who we were. My answer was enclosed in an envelope with the usual Arab superscription: 'Thou wilt reach, if it please God, the hands of Abu ben Aïssa.' I despatch it by our Senegalese marabout escorted by four Mussulman soldiers. My messengers will be preceded by a letter from Ibrahim, who writes as a Mussulman to a Mussulman, to announce his coming with a message which he is to deliver into the hands of Abu ben Aïssa himself. I have chosen this method of proceeding in order to give my men a chance to make their comments on my letter and so destroy the prejudice of those with whom they may come in contact on the way. In indicating our nationality, in my reply, I designedly select Algeria, so as not to assume a disadvantageous identification with other peoples who do not enjoy a reputation that predisposes in their favor. The residence of Abu ben Aïssa seems to be the key of the routes to the northwest and the north, towards the Benue and Bornu, and eastward, of those which are followed by the pilgrims bound for Mecca. The existence of the Mahdi is known in the country." . . .

M. de Brazza was to leave Bania at the end of March, to confer, if possible, with the Fulbe chiefs. He regards it as a point of great importance to be informed of the relations between the Mussulman element in the north and the idolaters of the south, and he reiterates his opinion, many times expressed, as to the paramount duty of avoiding everything that might take on the character of a military expedition. His plan is to send out Mussulman emissaries, natives of Senegal or of Algeria, from the French outposts into the different regions, there to act as an advanced guard of French influence and as agents of information and of propaganda. This is the method which has carried the Mohammedan teaching across Africa.

A NEW LAKE IN AFRICA.—According to *L'Afrique Explorée et Civilisée*, for September, a report from Dr. Oscar Baumann to the German Anti-Slavery Society, dated at Kadoto, April 13, 1892, tells of the discovery of a lake, hitherto completely unknown. Dr. Baumann had made the exploration of Lake Manjara (S.W. of Kilimanjaro) and found it to be 120 kilometres in length with a mean breadth of 30 kilometres (75 miles by 19 miles); the waters saline, and the shores covered with deposits of salt. From Little Arusha, just south of Kilimanjaro, the traveller crossed the Balanga country to the northern extremity of the lake, which he followed along the eastern shore and turned on the south, ascending the western side as far as Gorongo (Ngorongoro), west of Natron Lake, and discovered the little salt lake Gorongo. On the 21st of March he took a westerly direction and two days later, to his astonishment, came upon a vast sheet of water, called Lake Eiassi. "I was extremely surprised at this discovery," writes Dr. Baumann, "since nothing was known, even by hearsay, of the existence of this lake. The Masai assured me that this body of water extended as far as Iramba. This would give it a length of 150 kilometres (93 miles) and its width, in the northern portion which I explored, was from 30 to 50 kilometres (19 to 31 miles). The Masai in their expeditions follow the eastern shore, the route along the western side being made difficult by a stream coming from the Usukuma."

The editor of *L'Afrique* identifies this stream with the Wambere.

On the 12th of April Dr. Baumann beheld the Victoria Nyanza from the plateau of Kadoto. With the exception of one strip of territory in which, for twenty days, no native was seen, all the country traversed was inhabited. Water was abundant, and the climate between the Wambere steppe and the Victoria was healthful. There was not a case of fever in the party, and the temperature was rather too low than too high.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

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Travels in Togoland (Dr. R. Büttner)—A Winter in Bosekop, Lapland, by Otto Baschin.

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The Determination of the Boundary between the South African Republic (Transvaal) and the Portuguese Possessions on the South-east Coast of Africa (Friedrich Jeppe, Pretoria)—The Region of the Yukon river in Alaska and its Inhabitants (A. Lindenkohl, U. S. Coast and Geodetic Survey)—Prof. H. Pittier's Travels of Exploration through the south-western Part of Costa Rica (From Pittier's Reports, by Dr. H. Polakowsky)—Emin Pasha's Last Expedition, 1891 (Letter from Dr. Fr. Stuhlmann)—Investigations on the Depth and Temperature of the Weissensee in Carinthia (Dr. Karl Grissinger)—A New Map of the Argentine Republic on a Scale of 1-1,000,000 (Prof. Dr. L. Brackebusch)—Two Journeys into the Interior of Iceland (Th. Thoroddsen).

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Las Batuecas and Las Jurdes (the former in the province of Salamanca, the latter in Cáceres). Two Lectures before the Society by Dr. D. J. B. Bide—Roman Roads of the Province of Ciudad-Real, by D. Antonio Blázquez.

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ROME.—*Bollettino della Società Geografica Italiana.*

The Station of Let-Marefià (Dr. Traversi)—Capt. V. Bottego: In the Danakil Country—The Region between the Anseba and the Barca, as shown by the labors of Col. Baratieri—The Brichetti-Robecchi Collections—C. E. Biddulph and P. Della Valle on an Excursion into the Persian salt Desert—Botanical Excursion in the Dahlak Islands (Red Sea) by Dr. A. Terracciano—Girolamo Segato, Traveller, Cartographer and Chemist, by Dr. A. Wolynski—From Reyes to Villabella, by Prof. L. Balzan—From Puerto Colombia to Bogotá, by C. Vetovelli—The True Discoverers of the Azores, by P. Amat di S. Filippo—Botanical Exploration of the Eritrea, by Prof. R. Pirotta—On the Size of the Earth according to Leon Battista Alberti, by Prof. G. Uzielli—Ferrand's Somali Grammar, a Letter from L. Brichetti-Robecchi—Zöller's German New Guinea, by Prof. E. Teza.

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Notes on Liberia, principally after J. Büttikofer, by Prof. Guido Cora—Explorations in Dutch New Guinea, by F. S. A. De Clercq, ex-Resident of the Moluccas, at Ternate—The Italian Dominions in Africa—New Planimetric and Statistical Calculations, by Prof. Guido Cora.